

TABLE 1.—*Glacier studies on Klariden Glacier, Switzerland*

Period	Seasonal snowfall		Character of year		Seasonal residue of snow or glacier growth (sampler measure Aug. or Sept.), cm. water		Rise or fall of Niveau (m.)	Flow of glacier as measured at buoys (m.)
	Total-sator (Geiss-butzi-stock), cm. water annual, Aug. to Aug.	Upper buoy (maximum snow depth in May) cm. snow	Winter and spring	Summer	Upper buoy 2,900 m. elevation	Lower buoy 2,708 m. elevation		
1914-15 (Nov.-Aug.)						125 ¹		
1915-16 (Aug.-Aug.)	401				Approximately 258 ¹	Approximately 192 ¹		
1916-17 (Aug.-Aug.)	344	430	Heavy precipitation.	Warm	Approximately 222 ¹	0	Sunk	
1917-18 (Aug.-Sept.)	363	550 or more	Maximum snow depth in July.	Fair weather	238	120	Somewhat risen.	Upper buoy 18 m. (1 yr.) Lower buoy 11.9 m. (2 yrs.)
1918-19 (Sept.-Sept.)	380	560 or more (at Hut 380 in May).	Abnormally heavy snowfall.	Warm Aug.-Sept.	338 or more	242		East end 29 m. (1 yr.)
1919-20 (Sept.-Sept.)	380				336 ¹	84		Buoy covered by new snow in August before measurement could be made.
1920-21 (Sept.-Sept.)	210	205 (Mar. 31) 265 (July)	Abnormally light snowfall.	Abnormally warm.	0 (Aug. 3) ¹ -39 (Sept. 15)	350 (Aug. 3) ¹ 500 (Sept. 15)		Buoy buried in 1920 reappeared. By its movement 2 years (1919-21) 32 m. S. E. By new buoy 1 year (1920-21) 13 m. S. E.

¹ Estimated on basis of 60 per cent of depth of 209 cm.² Estimated on basis of 60 per cent of depth of 430 cm.³ Estimated on basis of 60 per cent of depth of 370 cm.⁴ Estimated on basis of 60 per cent of depth of 320 cm.⁵ Buoy lost. Estimated on basis of 60 per cent of depth of 209 cm.⁶ Season's snow entirely melted, so sampler could not be used. Losses of previous season's residue indicated by minus quantities, is on basis of 60 per cent of depth measured, though on account of pressure and weathering, it may be somewhat more.WIND DIRECTIONS AND VELOCITIES, NASHVILLE, TENN.
551.55 (768)By ROSCOE NUNN, Meteorologist
[Weather Bureau, Nashville, Tenn., June 5, 1924]

WIND DIRECTIONS

The writer has often wondered as to what may be usually understood by the expression, "prevailing wind direction." It is perfectly clear to the meteorologists, but probably not at all so to the technically unformed. The ordinary statement, "prevailing wind," means the wind that was registered or observed most often during a given period—the one direction, of the eight principal points of the compass, from which the wind was most often blowing.

If the prevailing wind for any month should be published as "north," that would mean that no other direction, of the eight points considered, was registered as often as north; but it would not mean that the wind was from the north most of the time, nor necessarily for even any high percentage of the time. It is conceivable that the wind might blow from each direction the same length of time during a day or a month; then each of the eight directions would have a percentage of 12.5; but if north should have 13 per cent and no other direction more than 12.5, then north would be the "prevailing wind," although, as a matter of fact, the other seven directions might be practically as highly represented as north.

As usually published, "prevailing wind" data are inexplicit. In order really to understand the characteristics of the wind at any station, the percentages of time for each direction should be known. To furnish such information is the object of the first part of this paper,

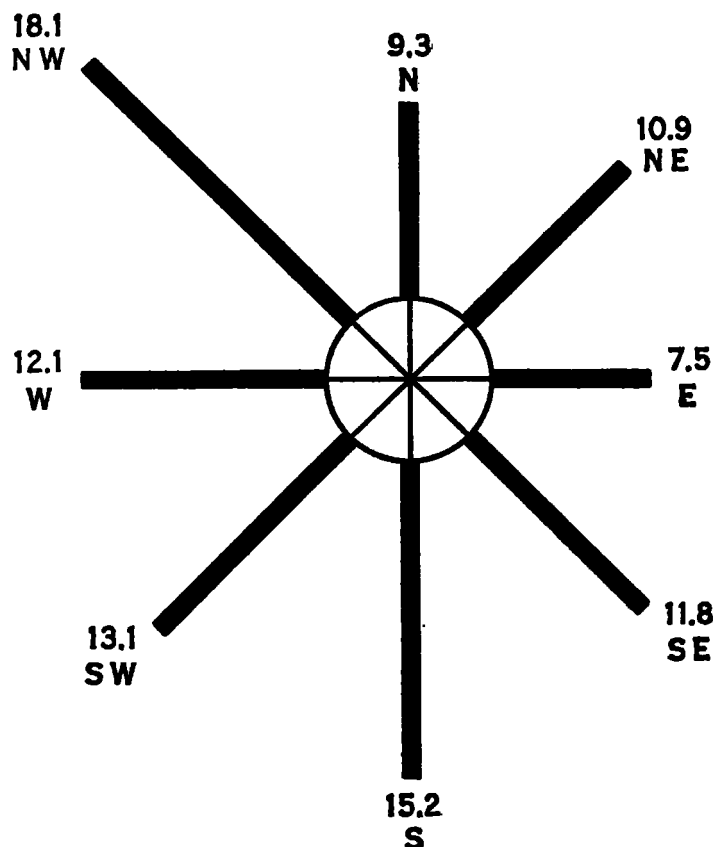


FIG. 1.—Annual average percentage of time the wind blows from the eight principal points of the compass at Nashville, Tenn.

while in the second part is given some data not ordinarily available in regard to wind velocities.

There seems to have been but little detailed wind direction data published. In the Weather Bureau Bulletin Q, Climatology of the United States, by Prof. Alfred J. Henry, pages 68-70, are given tables for 20 stations in the United States, showing the monthly and annual percentages of winds from each of the eight principal points of the compass for the 10-year period 1894-1903. Tennessee and adjacent States are not represented directly, Cincinnati, St. Louis, New Orleans, and Savannah being the nearest surrounding stations for which data are published. It seemed, therefore, of interest to compile records (Table 1) for Nashville, where the exposure of wind instruments has been good during the greater portion of the records and especially for the years selected, viz., 1895-1904 and 1918-1924. The two periods were combined and averages in the table are for 16 to 17 years, a period long enough to give fairly stable means. The figure showing the annual relative prevalence of the different winds is based upon records for the same combined periods.

TABLE 1.—Wind, average percentage of time from each direction, Nashville, Tenn.¹

	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	Pre- vail- ing direc- tion
January.....	8.6	9.1	8.5	10.9	16.2	12.2	12.2	20.6	1.1	NW.
February.....	10.8	9.6	6.8	9.6	14.8	11.8	10.6	25.2	0.6	NW.
March.....	10.1	10.6	7.5	13.2	20.5	9.9	8.8	18.4	0.8	S.
April.....	9.2	10.3	7.5	12.0	19.9	10.7	10.5	17.6	1.6	S.
May.....	9.1	11.4	9.2	11.6	14.8	14.9	11.0	15.6	2.5	NW.
June.....	9.0	11.4	6.7	10.4	11.0	16.8	15.8	16.4	2.5	SW.
July.....	8.1	10.1	6.5	10.5	12.4	19.2	16.2	15.8	1.0	SW.
August.....	8.6	11.1	7.1	11.2	12.2	16.8	15.5	15.8	2.2	SW.
September.....	10.5	13.1	9.6	11.9	12.7	10.9	9.6	17.9	3.8	NW.
October.....	8.9	13.7	7.2	14.1	14.4	10.0	10.2	17.8	4.1	NW.
November.....	10.0	11.2	6.5	14.2	16.4	9.6	12.2	18.6	2.4	NW.
December.....	8.4	9.2	7.1	12.3	17.6	13.9	12.7	17.5	1.3	S.
Year.....	9.3	10.9	7.5	11.8	15.2	13.1	12.1	18.1	2.0	NW.

¹ Compiled from records of self-registering instruments, period of 16-17 years (1895-1904, inclusive, and January, 1918, to April, 1924, inclusive).

WIND VELOCITIES

Some years ago investigation was made to determine the character of the wind movement at Nashville as shown in relative frequency of various velocities, or percentages of time the wind blows at stated velocities. The information was not published at the time. The results are now shown in Table 2.

It is necessary, of course, to consider the elevation of the instrument above ground and the other conditions of exposure in the use of all anemometer records. The exposure of the anemometer at Nashville has varied from a rather low elevation above ground during the early years to high during the last 15 years. During the period 1895-1904, which was used in the compilation of Table 2, the anemometer exposure was unchanged and the instrument was 134 feet above ground, with no high buildings near. This was a very good exposure at what might be called a medium height above ground. Following this period, the instruments were exposed on the roof of the Custom House annex for about five years, under unsatisfactory conditions, and in March, 1909, they were removed to the present location, where the anemometer is 191 feet above ground and where the wind movement registered is decidedly greater than at any previous location. No doubt the anemometer exposure of 1895-1904, height above ground being 134

feet, gives data more nearly representative of the wind movement as it affects buildings, trees, etc., than the present high exposure.

TABLE 2.—Wind, percentage of time at stated velocities, Nashville, Tenn.¹

	Velocities, miles per hour:							
	0-5	6-10	11-15	16-20	21-25	26-30	31-40	41-50
January.....	40.8	34.0	16.0	6.2	2.0	0.7	0.1	0
February.....	33.8	39.2	18.8	6.7	1.5	0.2	0.2	0
March.....	29.8	36.3	21.1	9.0	2.8	0.8	0.1	0
April.....	33.3	33.1	19.6	6.5	1.9	0.5	0.1	0
May.....	48.4	36.1	12.4	2.7	0.1	0	0	0
June.....	53.8	35.5	8.6	1.4	0.2	0	0	0
July.....	57.3	34.9	7.5	0.5	0	0	0	0
August.....	64.0	30.6	4.9	0.1	0.2	0	0	0
September.....	57.8	31.5	9.4	1.0	0	0	0	0
October.....	57.5	29.3	9.8	2.7	0.5	0	0	0
November.....	48.4	30.7	15.4	4.5	0.7	0.1	0.1	0
December.....	40.5	36.7	16.5	4.6	1.1	0.7	0.1	0
Year.....	47.1	34.4	13.3	3.8	0.9	0.25	0.06	0

¹ From records of 10 years, 1895-1904, inclusive. Elevation of anemometer above ground, 134 feet; above sea level, 594 feet.

In connection with both wind direction and wind movement, Table 3 is presented to show the average velocity of the wind from the eight principal points. This information was easily compiled from the data found on page 13, Form 1001, which was begun January 1, 1918. The record is for a period of only 6 to 7 years; however, it gives averages that may be fairly substantial. These are the first data showing relative strength of the winds from different directions that this station has prepared, and I can not recall any previously published data of just this character for other places.

TABLE 3.—Wind, average velocity for each direction, miles per hour, Nashville, Tenn.¹

Stations	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Mean
January.....	9.4	8.5	6.2	7.9	10.8	10.1	9.8	12.2	9.4
February.....	10.4	8.8	6.2	9.1	10.5	11.1	9.4	12.4	9.7
March.....	10.5	8.2	6.9	11.5	14.3	13.8	12.2	13.8	11.4
April.....	10.3	8.8	7.2	11.1	12.7	11.5	10.6	12.2	10.6
May.....	8.1	7.7	6.2	8.0	9.4	9.1	7.1	9.0	8.1
June.....	7.8	7.7	6.0	6.4	7.4	7.8	6.9	7.6	7.2
July.....	7.0	6.7	5.8	6.1	6.7	7.0	6.4	6.6	6.5
August.....	6.8	6.5	5.6	6.2	6.6	7.3	6.0	6.8	6.5
September.....	6.7	7.5	5.6	6.5	6.8	7.6	5.5	6.8	6.6
October.....	7.9	6.7	6.0	9.6	8.6	7.8	6.4	10.0	7.9
November.....	9.0	7.5	5.8	10.4	11.1	7.4	8.1	11.1	8.8
December.....	8.2	7.6	5.8	10.4	12.8	10.8	11.0	13.3	10.0
Year.....	8.5	7.7	6.1	8.6	9.8	9.3	8.3	10.2	8.6

¹ Compiled from records for the period January 1, 1918, to April 30, 1924 (6-7 years). Height of anemometer above ground, 191 feet; above sea level, 675 feet.

PHYSIOLOGICAL HEAT REGULATION AND THE PROBLEM OF HUMIDITY

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[Excerpts from paper read at the January, 1921, meeting of the American Society of Heating and Ventilating Engineers at Philadelphia, and published in part in The Heating and Ventilating Magazine, New York, Feb. 1921, pp. 43-45]

This paper discusses the heat regulation of the human body as an engineering problem and brings out the importance of humidity as external aids to this process.

The human body is a thermostat, the temperature of the body—that is, the internal parts—is constant. By constant is meant exactly what engineers mean when they say the temperature of a room with thermostatic control is constant. It really varies somewhat, and the small variations are made the basis of regulation.